AN ANNOTATED LIST OF TRICHOPTERA IN THE BLACK BELT PRAIRIE REGION OF WEST CENTRAL ALABAMA[1]

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ABSTRACT: Distributional records for 72 species of caddisflies from 15 sites located in the Black Prairie Region of West-Central Alabama are presented, along with information on seasonal occurrence, habitat and relative abundance. Leptoceridae is best represented (22 species), followed by Hydropsychidae (17 species), Hydroptilidae (17 species), Polycentropodidae (6 species), Philopotamidae (5 species), Limnephilidae (2 species), Phryganeidae (2 species), and Molannidae (1 species). Of the species reported, 12 are new records for this area.

The Black Belt Prairie Region or Black Belt is a Physiographic Subdistrict of the East Gulf Coastal Plain that is geologically and biologically distinctive among physiographic regions of the Coastal Plain. The Black Belt is a crescent shaped region of approximately 8,000 square miles that extends southward from West Tennessee into Northeastern Mississippi and eastward into West-Central Alabama. This region is characterized by deeply weathered undulating plains of relatively low relief, that are developed on chalk and marl of the Selma Group (Copeland 1968). The Selma Chalk is composed of concentrations of fossiliferous, soft, white-gray limestone (chalk) that weathers into a fertile black soil. The soil of this region is particularly noted for baking hard and dry in the summer and becoming highly adhesive when wet (Doster and Weaver 1987). Many of the chalk beds of this region contain more than 75 percent calcium carbonate (Szabo and Beg 1977).

Because of the thin soils and the impermeable nature of the chalk bedrock, the Black Belt represents a unique and clearly defined hydrologic region in the Coastal Plain. The streams of this region are noted for high turbidity, high rates of runoff, and great variability in flow (Harper 1943, Harris et al.1991). During the dry seasons the smaller streams go dry and the larger streams are significantly reduced in flow. Harper (1943) noted that this was the driest region of the state, and that prairie grasslands once covered up to 10% of the area. Because of its harsh hydrologic characteristics, this region has a negative impact on the distributions of many aquatic organisms.Many species of fish, mollusks, and aquatic insects that are common throughout the Coastal Plain are rare or absent within the Black Belt. An extensive survey of the fishes of Alabama (Mettee et al. 1989) has shown that 16 species of fishes common to the Coastal Plain are absent or rarely encountered in the Black Belt. Prelimi-

[1] Received December 20, 1998. Accepted December 27, 1999.

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nary work on caddisflies in Alabama indicates that many common Coastal Plain caddisflies are absent from the Black Belt, but that at least one species is endemic to this region (Harris et al. 1991).

In view of the natural history and unique hydrology of this region, along with the lack of aquatic entomological surveys for the area, a thorough survey of the caddisflies of the Black Belt was conducted during 1993 and 1994. The objective of this survey was to gather information on species composition, abundance, and distribution of the caddisflies of this physiographic region. This information should be useful to both industries and agencies trying to regulate and maintain water quality, as well as to systematists, biogeographers, and ecologists conducting research on the Black Belt and the aquatic systems of other regions.

METHODS AND RESULTS

In order to determine the caddisfly fauna of the Black Belt, light-trap collections were made for adult specimens. Ultraviolet lights were connected to rechargeable 12-volt gel batteries and placed over white enamel pans filled with 80% ethanol. The batteries have a 3-hour life span. The traps were placed at the sites about 1 to 1.5 hours before dusk and operated until 1.5 to 2 hours following dusk. Collections were made monthly from February 1993 to January 1994. During the warmer months (March-October) aerial nets were used to sweep the riparian vegetation for any adults not attracted to lights. Benthic "kick" samples were taken with aquatic D-frame nets at all sites where possible in order to obtain larval and pupal specimens. "Kick" samples were taken during the wettest months (November-April) when sufficient flow was available for collecting. Collected specimens were taken to the lab where they were identified to the lowest taxon level possible.

In order to characterize further the aquatic environment of the study area, several water quality parameters were measured monthly at all collection sites. Water temperature (bulb thermometer), pH (Cole-Parmer Model 612 pH meter), and conductivity (Cole-Parmer Model 1481-40) were determined in the field. Water samples were collected quarterly and returned to the laboratory to determine alkalinity (Wetzel and Likens 1979). A list of water quality parameters by site is given in Table 1. All parameters are expressed as the mean of the monthly and quarterly samples.

From this survey a total of 182 collections were made from which 21,877 caddisflies were identified. Seventy-two (72) species representing eight families and 24 genera were recorded. An annotated list of species documented is presented below (Table 2). Information for each species includes collection sites and number of specimens collected. A more detailed discussion of distributions is contained in Haynes (1995). An asterisk indicates species previously not reported from the Black Belt (*). In most cases only males of the species were identified. Voucher specimens are housed in the Aquatic Insect Museum of the University of Alabama.

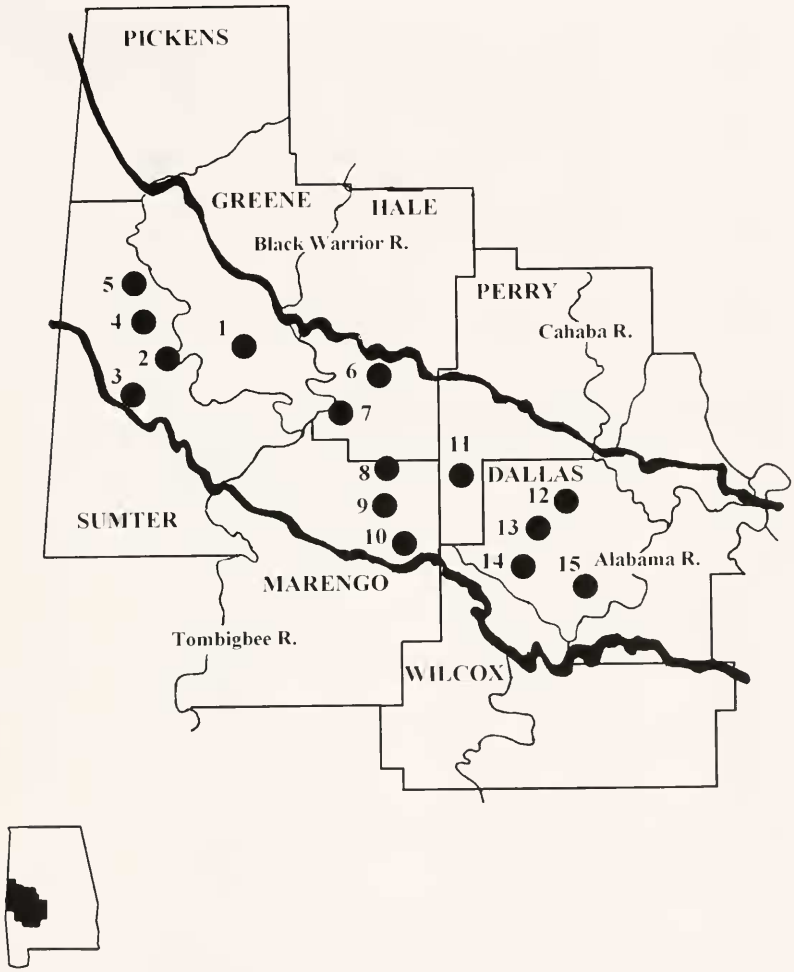

Figure 1. Collecting sites in the West Central Alabama Black Belt Prarie Region of West-Central Alabama. Numbers correspond to those listed in text.

COLLECTION SITES

1. Greene Co.; Taylor Creek; County Road 72, 5 mi S Boligee, T20N, R1E, Sec. 21.
2. Sumter Co.; Wiggins Creek; U.S. Highway 11, ¼ mi S Epes, T20N, R2W, Sec. 25.
3. Sumter Co.; Brown Brick Creek; unnamed dirt road ¼ mi off State Highway 28, 2 mi NW Livingston, T19N, R2W, Sec.7&8.
4. Sumter Co.; Turkey Creek; State Highway 39, 6.5 mi S Gainesville, T20N, R2W, Sec. 11.

5. Sumter Co.; Noxubee River; County Road 85, 1 mi N Gainesville, T21N, R2W, Sec. 3.
6. Hale Co.; Jacks Branch; County Road 16, 6 mi S Greensboro, T19N, R4E, Sec.13.
7. Hale Co.; Yellow Creek; County Road 2, 3 mi S Arcola, T18N, R3E, Sec.15.
8. Marengo Co.; Powell Creek; unnamed dirt road 3 mi off U.S. Highway 80E, 4 mi W Faunsdale, T17N, R4E, Sec. 10.
9. Marengo Co.; Little Dry Creek; County Road 44, ½ mi W Dayton, T16N, R4E, Sec.14.
10. Marengo Co.; Whites Branch; County Road 80, 2 mi N Thomaston, T15N, R5E, Sec. 5.
11. Perry Co.; Tayloe Creek; unnamed dirt road 1 mi off U.S. Highway 80E, 3.5 mi E of Uniontown, T17N, R6E, Sec. 24.
12. Dallas Co.; Tatum Creek; County Road 11, ½ mi NW Orrville, T16N, R8E, Sec. 28.
13. Dallas Co.; Bogue Chitto Creek; State Highway 22, 2 mi W Orrville, T15N, R8E, Sec. 7.
14. Dallas Co.; Bear Creek; County Road 21, 3.5 mi W Orrville, T15N, R8E, Sec. 7.
15. Dallas Co.; Big Swamp Creek; County Road 33, 1 mi NE Five-Points off County Road 33, T15N, R8E, Sec. 25.

Table 1. Annual mean values for selected water quality parameters of streams sampled in the Black Belt Prairie Region of Alabama (1993)

Stream	Air Temp. (°C)	Water Temp. (°C)	pH (SU)	Conductivity (umhos/cm)	Alkalinity (mg/l as $CaCO_3$)
Taylor Cr.	21.5	19.7	6.9	456.7	13.6
Wiggins Cr.	21.3	18.5	7.6	460.4	16.0
Brown Brick Cr.	20.5	19.5	7.3	453.4	15.7
Turkey Cr.	21.8	22.1	7.5	375.5	19.2
Noxubee River	21.1	19.5	7.6	220.3	5.8
Jacks Branch	23.0	19.4	7.3	444.5	10.8
Yellow Cr.	21.0	19.3	7.1	447.0	17.1
Powell Cr.	21.6	19.4	7.2	470.7	13.3
Little Dry Cr.	21.0	19.3	7.2	510.5	21.0
Whites Branch	20.7	18.5	7.4	111.8	10.8
Tayloe Cr.	19.3	17.8	7.0	495.6	15.7
Tatum Cr.	20.7	18.8	7.0	112.0	3.3
Bogue Chitto Cr.	20.8	19.0	7.1	162.0	6.7
Bear Cr.	21.0	19.7	7.3	348.0	9.2
Big Swamp Cr.	22.3	17.6	7.0	88.3	1.7

Table 2. Annotated list of species collected in the Black Belt Prairie Region

Family	Species	Collection Site Number	# of Individuals
Hydropsychidae	*Cheumatopsyche burksi* Ross	1,2,6,7,8,9,10,12,13	17
	C. campyla Ross	1,2,3,5,6,11,12,13,14,15	323
	C. edista Gordon	1,4,8,12,14	17
	C. ela Denning	5,12,13,15	73
	C. geora Denning*	11,12	4
	C. pasella Ross	1,2,3,4,5,6,7,8,9,10,11,12, 13,14,15	2,444

Family	Species	Collection Site Number	# of Individuals
	C. pettiti (Banks)	1,2,3,5,6,8,9,11,12,13,14	518
	C. sordida (Hagen)	1,3,5,12,14	13
	Hydropsyche alvata Denning	4,5,11,13,14	123
	H. betteni Ross	12,13,14	11
	H. sp. nr. *frisoni* Ross	4	12
	H. mississippiensis Flint	9,14	6
	H. orris Ross	1,2,3,4,5,6,7,8,9,10,11,12, 13,14,15	3,010
	H. rossi Flint, Voshell, and Parker	2,6,9,12,13,14	201
	Macrostemum carolina (Banks)	1,2,4,5,6,8,9	95
	M. transversum (Walker)	3,4,5	119
	Potamyia flava (Hagen)	6,7,8,11,13,14,15	233
Polycentropodidae	*Cernotina calcea* Ross	1,2,3,4,5,6,7,8,9,11,12,13,14	3,032
	Cyrnellus fraternus (Banks)	1,2,4,5,6,7,8,11,12,13,14,15	406
	Neureclipsis crepuscularis (Banks)	2,5,11,12,13,14,15	40
	Paranyctiophylax affinis (Banks)	3	19
	P. serratus (Lago and Harris)	3,10,12,14,15	11
	Polycentropus crassicornis Walker*	1,2,6,7,8,9,10	73
Philopotamidae	*Chimarra aterrima* Hagen*	15	6
	C. florida Ross	12,15	9
	C. moselyi Denning	11	8
	C. obscura (Walker)	1,2,5,6,7,8,10,11,12,13,14,15	952
	C. parasocia Lago and Harris	5	6
Hydroptilidae	*Hydroptila alabama* Harris and Kelley	1,12,13,14,15	150
	H. angusta Ross	1,3,4,6,12,13	57
	H. armata Ross	1,8,12,13,15	42
	H. cretosa Harris*	1	11
	H. gunda Milne	1,7,12,13,14,15	73
	H. hamata Morton	1,3,5,7,12,13,14,15	116
	H. novicola Blickle and Morse	1,11,12,13,15	232
	H. quinola Ross	1,7,12,13,15	20
	H. waubesiana Betten	1,3,5,7,8,9,11,12,13,14,15	450
	Neotrichia vibrans Ross	5,12,13,15	48
	Ochrotrichia confusa (Morton)*	5,13,15	48
	O. dardeni Harris	2,3,4,6,13,14	71
	Orthotrichia aegerfasciella (Chambers)	1,2,3,4,5,6,7,8,11,12,13,14,15	262
	O. cristata Morton	2,3,4,6,8,10,11,12,13,15	75
	Oxyethira janella Denning	12,13,14,15	245
	O. novasota Ross	1,4,5,10,12,13,15	41
	O. pallida (Banks)	1,4,5,10,12,13,15	586
Limnephilidae	*Ironoquia punctatissma* (Walker)*	9	9
	Pycnopsyche scabripennis (Rambur)*	15	9
Phryganeidae	*Agrypnia vestita* (Walker)*	8,11,14	6
	Ptilostomis postica (Walker)*	1,5,6,7,10	27
Leptoceridae	*Ceraclea flava* (Banks)	2,3,5,11,12,13,14,15	625

Family	Species	Collection Site Number	# of Individuals
Leptoceridae	*C. maculata* (Banks)	1,2,3,5,6,7,8,9,10,11,12,13, 14,15	1,271
	C. nepha (Ross)	1,2,4,10,12,13,14	33
	C. ophioderus (Ross)	2,3,6,13,14,15	51
	C. protonepha Morse and Ross	1,2,5,7,8,9,11,12,13,14	60
	C. tarsipunctata (Vorhies)	1,2,4,5,6,7,8,9,10,11,13,14,15	162
	C. transversa (Hagen)	1,7,8,9,12,13,15	19
	Nectopsyche candida (Hagen)	1,4,5,7,13,14,15	177
	N. exquisita (Walker)	12,13	316
	N. pavida (Hagen)	5,6,12,13,14,15	249
	Oecetis avara (Banks)	5,9,13,14	370
	O. cinerascens (Hagen)	1,2,3,4,5,7,8,9,10,11,12,13, 14,15	516
	O. ditissa Ross	1,2,3,4,5,6,7,8,9,10,11,12, 13,14,15	375
	O. inconspicua (Walker)	1,2,3,4,5,6,7,8,9,10,11,12, 13,14,15	677
	O. nocturna Ross	1,2,3,4,5,6,7,8,9,11,12,13, 14,15	2,205
	O. osteni Milne	10,13,14	62
	O. persimilis (Banks)	1,2,3,4,5,11,12,13,14,15	227
	O. sphyra Ross	2	32
	Triaenodes ignitus (Walker)	2,12,13,14,15	17
	T. melaca Ross*	2,10,11	45
	T. ochraceus (Betten and Mosely)*	13	6
	T. tardus Milne	1,2,4,5,7,8,12,13	46
Molannidae	*Molanna tryphena* Betten*	13	8

DISCUSSION

One hundred eighty two collections from 15 streams in the Black Belt yielded 72 species of caddisflies, from 24 genera and eight families. Three families, five genera and 12 species were found that were previously not reported as occurring in the Black Belt. No species new to science, or new state records were discovered. Adults were collected from February to November. The number of species collected was greatest from May to July, with the greatest number (56) being collected in May. The number of individuals collected was greatest from April to June, with June yielding the greatest numbers (9,035). The total number of adult specimens collected and identified was 21,877. The number of species of caddisflies in the Black Belt Prairie is slightly lower than other regions and drainages of Alabama. Surveys of other aquatic organisms in this region have also produced low species numbers and is probably due to the region's harsh prairie-like characteristics, in particular the intermittent nature of most of this region's streams. However, the familial composition of caddisflies in the Black Belt Prairie is similar to other regions throughout Alabama. The Hydropsychidae (17 species), Hydroptilidae (17 species), Lepto-

ceridae (22 species), and Polycentropodidae (6 species) were represented by a total of 62 species, which accounts for 86 percent of the species collected. The Philopotamidae (5 species), Limnephilidae (2 species), Phryganeidae (2 species), and Molannidae (1 species) were represented by a total of 10 species which accounted for a total of 14 percent of the species collected.

By site, taxa richness ranged from 49 species at Bogue Chitto Creek (Site 13), which represented 68 percent of all species collected, to 19 species at Whites Branch (Site 10), which represented 26 percent of all species collected. The average number of species collected at a site was 30, with 7 of the sites having 30 or more species. Monthly, taxa richness ranged from 56 species collected in May (77 percent of all species collected) to 1 species collected in February. No specimens of Trichoptera were collected in December or January. In terms of biomass, Bogue Chitto Creek yielded the largest number of individuals (5,569), representing 25.5 percent of the total number of individuals collected (21,877), while Little Dry Creek (Site 9) yielded the smallest number (406 individuals), which represented only 1.9 percent of the total number of individuals collected. In general, most sites yielded over 700 individuals, with 5 sites yielding over 1,000 individuals. Throughout the year, the number of individuals collected ranged from 9,035 (41.3 percent of the total) in June, to only 2 individuals in February. Most individuals emerged during the warmer, summer months.

In general, Trichoptera were common throughout the entire study area. However, certain regions yielded a larger number of species and individuals than others. The eastern region of the study area (sites 11-15), located in Dallas and Perry Counties, produced both the greatest number of species and individuals, followed closely by the western region (sites 1-5), located in parts of Sumter and Greene Counties. The central region of the study area (sites 6-10), located in Hale and Marengo Counties yielded the lowest number of species and individuals. Many species such as *Cheumatopsyche sordida*, *Ceraclea flava*, and *Neureclipsis crepuscularis* that were commonly collected in the western and eastern regions were completely absent in the central region of the study area. A survey of the region's agricultural activity reveals that the central part of the study area is the most heavily farmed region. In the western and eastern regions, farming activities comprise much fewer acres (Kleweno 1994). Streams of the central region are more heavily silted than in other regions, and overall water quality appears to be lower in streams of the central region. Other species were restricted to only a single region, such as *Hydropsyche betteni*, which was found only in the eastern region. Several species were restricted to a single stream such as *Paranyctiophylax affinis*, which was found only in Brown Brick Creek. However, most species were found in several streams located throughout the entire study area.

Previous surveys of this region (Harris et al. 1991) indicated that as many as 67 species were likely to occur in the Black Belt. This survey recorded 60 of

those species plus an additional 12 species that were previously unknown from the Black Belt. Out of the previously unknown species, three families (Limnephilidae, Molannidae, and Phryganeidae) representing five genera (*Agrypnia, Ironoquia, Molanna, Ptilostomis,* and *Pycnopsyche*), are new records for the Black Belt. Although seven species previously found in the Black Belt were not identified in this survey, all previously known families and genera, except the genus *Leptocerus* were recorded in this study. No species new to science were discovered, and no new state records were established. However, four species (*Ochrotrichia confusa*: Hydroptilidae, *Ironoquia punctatissma* and *Pycnopsyche scabripennis*: Limnephilidae, *Agrypnia vestita*: Phryganeidae), previously known only from regions of the state located on or above the Fall Line, were collected in this survey.

ACKNOWLEDGMENTS

The Department of Biology at the University of Alabama provided support and facilities during the course of this study and is gratefully acknowledged. We would like to thank S.C. Harris, Clarion University for verifying several identifications. We would also like to thank S. Harris, R. Holzenthal, B. Stark, and P. Lago for reviewing the manuscript.

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